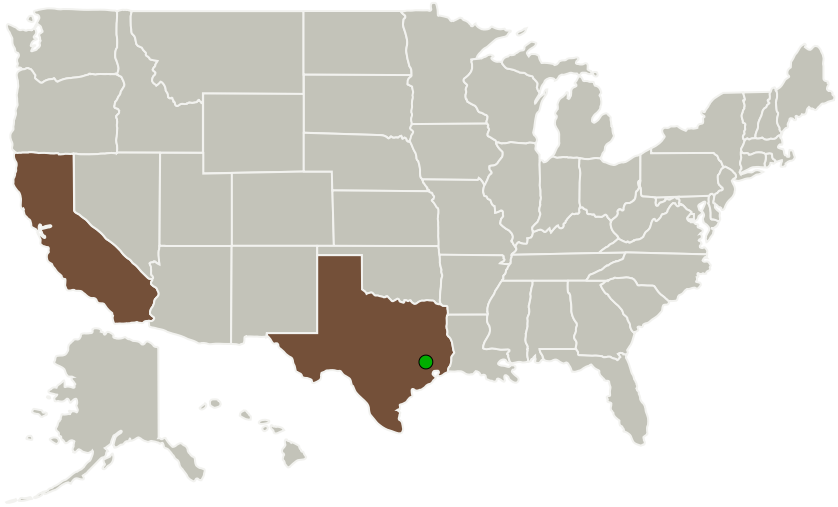
Modified Ionic Liquid-Based High-Performance Lubricants for Robotic Operations, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

NASA requires a highly efficient lubrication system for robotic operations, which will withstand very low temperatures (20 K) and other rigors of outer space and planetary surface operations. Building on prior experience in the materials area, InnoSense LLC (ISL) and an experienced consultant will formulate ionic liquid (IL)-based lubricants that will be not only thermally resistant but also compatible with a variety of raw materials for potential NASA-relevant lubricant formulation. Phase I tasks are designed to develop a library of these lubricant formulations by synthesizing and testing according to specified durability metrics. During Phase I, ISL will demonstrate the proof of concept by formulating IL-based lubricants and evaluating physical properties, coefficient of friction, and thermal tolerance. The Phase II project will focus on optimizing a line of IL-based lubricant formulations, fine-tuning physical properties at extreme temperatures, and investigating electrical applications.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Innosense, LLC	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Torrance, California
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
California	Texas

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140235)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Innosense, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

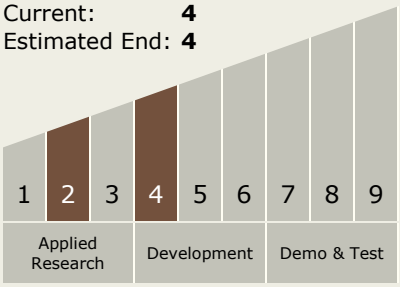
Carlos Torrez

Principal Investigator:

Rashmi Dalvi

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.2 Mobility
    - TX04.2.4 Surface Mobility

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System